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In re Patent Application of

APPLEBY

Atty. Ref.: 36-1201

Serial No.: 09/051,070

Group Art Unit: 2123

Filed: April 2, 1998

Examiner: Phan, T.

For: TRAINING APPARATUS AND METHOD

July 28, 2003

APPEAL BRIEF

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P.O. Box 1450
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Sir:

Appellant hereby appeals the Final Rejection of April 10, 2003.

REAL PARTY IN INTEREST

The real party in interest is the assignee, British Telecommunications public limited company, a corporation of Great Britain.

RELATED APPEALS AND INTERFERENCES

The Appellant, the undersigned, and the assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF THE CLAIMS

Claims 1-16 and 20-30 remain pending in this application. Claims 1-16 and 20-30 stand rejected by the Examiner, the rejections of which are appealed.

STATUS OF ANY AMENDMENT FILED SUBSEQUENT TO FINAL REJECTION

No Amendment under Rule 1.116 has been filed in response to the April 10, 2003 Final Rejection.

The claims as presented in the Appendix to this brief are as amended by the Amendments filed on January 28, 2003, January 16, 2002, July 27, 2001, January 19, 2001 and April 2, 1998.

CONCISE EXPLANATION OF THE INVENTION

The present invention relates to a computer system and method for training a user, and in particular, a system and method of training a user to write and/or speak in a foreign (i.e., target) language using simulated transactions (e.g., grocery shop scenario). The system includes a computer terminal 10 which communicates with a host computer 20 (see Fig. 1). Input text in the target language is entered by a user on terminal 10 (see Fig. 4A). This input text is forwarded to host computer 20 which provides feedback of several types (e.g., a positive or negative expression on the face of a displayed character) to be visually displayed on screen 108 of terminal 10 (see Figs. 4B-4D). For example, if the input text can be understood, a positive expression of the character will be displayed (see Fig. 4B). If the input text can be understood but contains recognized spelling or grammatical errors, visual feedback is given in the form of a confirmation of what the transaction should be as output text. If the input text cannot be

APPLEBY -- Application No. 09/051,070

understood because one or more words (after spell correction) cannot be recognized, a negative expression of the character is displayed and output text in the target language is generated to question the unrecognized words (see Fig. 4C).

Host computer 20 comprises a communications port 202 which enables communication with terminal 10, a central processing unit 204 and a store 206 (see Fig. 5). Store 206 contains a lexical database 208, a rules database 210, a transaction table 214, a response table 216 and a buffer 220. Lexical database 208 comprises a plurality of word records 208a-208n each comprising, for example, the word itself in the target language, the syntactic category of the word (e.g., whether it is a noun, pronoun, verb) and values for a number of standard features of the word (e.g., the gender of the word). Rules database 210 comprises a plurality of rules 210a-210n each specifying a rule of syntax structure of the target language. Transaction table 214 comprises a number of entries 214a-214n relating to specific information about transactions relating to the particular scenario being simulated. Response table 216 comprises a plurality of entries 216a-216b each corresponding to one type of output control message generated by host computer 20, and storing, for that output, the anticipated types of response. Buffer 220 stores the last few system outputs as high level semantic structures.

In order to detect simple errors in the input text, at least some of the rules stored in rules database 210 comprise a first rule which specifies those agreements (e.g., gender and number) which are grammatically necessary for the corresponding syntactic structure to be correct, but also a plurality of relaxed versions of the same rule, in each of which one or more of the agreement constraints is relaxed. For example, for a first rule 210a which specifies correct agreement of both gender and number, there are associated relaxed rules 210b and 210c, the first

APPLEBY -- Application No. 09/051,070

of which (relaxed rule 210b) corresponds to rule 210a but lacks the requirement for an agreement of gender, and the second of which (relaxed rule 210c) also corresponds to rule 210a but lacks the requirement for an agreement of number. Input text is first parsed using the strict rule and, where parsing using the strict rule is unsuccessful, the relaxed rule(s). When the input text is successfully parsed by a relaxed rule but not by a corresponding strict rule, the grammatical error determined to be present in the input text is that corresponding to the constraint that was relaxed in the relaxed rule.

In operation, after receiving input text from terminal 10, host computer 20 will scan the input text to determine whether it relates to one of the transactions in a predetermined stored list. Whether all of the information necessary for that transaction is complete is then determined. If so, visual feedback including a returned control message from host computer 20 will be displayed on display device 108 of terminal 10 to indicate that all of the information necessary for that transaction is complete. Host computer 20 spell corrects and parses the input text for apparent errors of spelling or grammar, and causes the returned control message to include the indicated errors. Grammatical errors can be detected using the strict and relaxed rules as noted above. Host computer 20 also generates user guidance text indicating, in the source language, useful information about the target language dialogue.

A buffer 220 stores the most recent system outputs from host computer 20 as high level semantic structures. By referring to buffer 220, it is possible to determine what system output the input text is attempting to respond to, and using the response table 216, to assess the likeliest types of response and (by reference to syntactic categories table 218) the likely syntactic form in which the anticipated responses will be expressed.

CONCISE EXPLANATION OF THE ISSUES PRESENTED FOR REVIEW

Whether claims 1-16 and 20-30 are anticipated under 35 U.S.C. §102(e) by Lee et al. (U.S. '057, hereinafter "Lee").

WHETHER THE CLAIMS STAND OR FALL TOGETHER

Claims 1, 4, 10-14, 16 and 21-23 stand or fall together and do not stand or fall with any other claim.

Claims 2-3, 5 and 20 stand or fall together and do not stand or fall with any other claim.

Claims 6-9, 15 and 27 stand or fall together and do not stand or fall with any other claim.

Claims 24-26 and 28-29 stand or fall together and do not stand or fall with any other claim.

Claims 25 and 30 stand or fall together and do not stand or fall with any other claim.

The specific reasons for each of the above groups of claim(s) standing or falling together or alone is provided below in the section entitled "Arguments with Respect to the Issues Presented for Review."

ARGUMENTS WITH RESPECT TO THE ISSUES PRESENTED FOR REVIEW

Claims 1-16 and 20-30 are not anticipated under 35 U.S.C. §102(e) by Lee.

For a reference to anticipate a claim, each element must be found, either expressly or under principles of inherency, in the reference. Appellant respectfully submits that Lee fails to disclose each element of the claimed invention. For example, Lee fails to disclose a training apparatus for training a user to engage in transactions with another person whom the apparatus is

APPLEBY -- Application No. 09/051,070

arranged to simulate as required by independent claims 1 and 2 and their respective dependents. Rather than training a user to engage in transactions with another person whom the apparatus is arranged to simulate, Lee merely discloses training models for automatically recognizing selected key words interspersed within extraneous speech. In short, Lee discloses an automatic speech recognition system, not a training apparatus. The only "training" disclosed by Lee relates to training models such as word models, sink (extraneous speech) models and/or background silence models. The "training" disclosed by Lee has nothing to do with training a user.

With respect to the above feature, the final rejection states "...the examiner responds such feature as in the applicant's argument does not appear in the claims or in the functional language." (See page 9, lines 10-13 of the final rejection). Appellant respectfully disagrees. Independent claims 1 and 2 explicitly require "Training apparatus for training a user to engage in transactions with another person whom the apparatus is arranged to simulate, the apparatus comprising: ...an output device for making the output available to the user so that said user can be trained to engage in transactions with another person." The "training apparatus" feature discussed above therefore appears in independent claims 1 and 2 and their respective dependents.

Claim 1 further requires the following features:

- "(a) determine whether said input is an allowable response to a most recent one of the output messages represented by data stored in the output message buffer; and
- (b) if said input is not determined to be an allowable response to a most recent one of the messages, determine whether said input is an allowable response to a preceding message represented by data stored in the output message buffer."

Through the above feature, a training apparatus stores not only the most recent question asked by the training apparatus but also at least one previous question. The training apparatus

APPLEBY -- Application No. 09/051,070

interprets whether a user's input contains information relevant to a previous question asked by the training apparatus if it is determined that the user's input is not relevant to the most recent question. (See, e.g., page 15, lines 5-11 of the specification.)

The final rejection apparently alleges that the above claimed feature is disclosed by the abstract, col. 5, lines 5-17, col. 6, lines 5-13 and/or col. 7, lines 10-27. (See page 9, lines 1-9 of the final rejection). Appellant has reviewed each of these specifically identified passages and respectfully disagrees. Each of these passages refers to training models for later use in a speech recognition system. In particular, Lee discloses generating one or more word models from a training data set of labeled speech (see col. 5, lines 17-19), and automatically generating sink (extraneous speech) models and background silence models using training procedures having a large pool of extraneous speech signals (see col. 6, lines 5-13 and 24-28). These passages have absolutely nothing to do with determining whether an input from a user is an allowable response to a most recent output message from a training apparatus, let alone determining whether the input from the user is an allowable response to a preceding message if the input is not determined to be an allowable response to the most recent output message. Indeed, Lee explicitly teaches "Our goal is to be able to automatically generate the sink models with no user interaction (emphasis added)." (See col. 6, lines 31-37). The training procedures disclosed by Lee allow the models to be trained so that they can later be used to recognize key words in user speech. However, these training procedures disclosed by Lee do not relate to training users.

Independent claim 2 further requires a rule store containing rules specifying grammatically allowable relationships between words of input dialogue from a user, wherein the rule store contains first rules comprising criteria specifying correct relationships between words.

APPLEBY -- Application No. 09/051,070

of a lexical store, and, associated with the first rules, one or more second rules each corresponding to one of the first rules but with one relationship criterion relaxed. The final rejection states “In response to applicant’s response Lee fails to disclose rules with relationship criterion relaxed (page 5, second paragraph), the examiner responds Lee discloses relieving constraints in training procedure (col. 7, lines 10-27).” (See page 9, lines 14-16 of the final rejection). The final rejection further states “Such constraint removal is equivalent to relationship relaxed for automatically training the model effectively.” (See page 9, lines 17-18 of the final rejection). Appellant respectfully disagrees. For example, col. 7, lines 10-12 of Lee states “The third, and fully automatic, training procedure that is proposed to remove all labeling and segmentation constraints on the database used to train the sink (extraneous speech) model.” This passage of Lee refers to relieving constraints on the database used to train the sink model. The “constraints” on the training database in Lee is not “equivalent” to a first rule comprising criteria specifying correct grammatical relationships between words of input dialogue from a user, and a second rule corresponding to the first rule but with one relationship criterion relaxed. The “fully automatic” training procedure disclosed by Lee involves no user interaction. The unconstrained training database disclosed by Lee therefore does not disclose rules specifying grammatically allowable relationships, let alone grammatically allowable relationships between words of input dialogue from a user. The removal of constraints in the fully automatic training database disclosed by Lee is thus clearly not “equivalent” to a second rule specifying grammatically allowable relationship but with one relationship criterion relaxed with respect to a first rule. Similar comments apply to dependent claims 25 and 30.

APPLEBY -- Application No. 09/051,070

Claim 6, which depends from independent claim 1 specifically requires “provid[ing] language training, in which said rules, said words and said output are in a training target language, and further arranged to generate user guidance in a source language for said user and different to said target language (emphasis added).” Lee clearly fails to disclose or even suggest this feature. The only “training” disclosed by Lee is the training of models used for an automatic speech recognition system. Lee fails to disclose or suggest language training, let alone language training which provides output in a training target language and generates user guidance in a source language (different than the target language).

Like independent claim 1, independent claim 24 requires the following features:

- (a) determine whether said input is an allowable response to a most recent one of the messages represented by data stored in the output message buffer; and
- (b) if said input is determined not to be an allowable response to a most recent one of the messages, determine whether said input is an allowable response to another one of the messages represented by data stored in the output message buffer.

Independent claims 28 and 29 requires similar features. As discussed above with respect to claim 1, Lee discloses utilizing trained models for use in a speech recognition system. The speech recognition system identifies key words within extraneous speech and performs a process triggered by recognition of a particular key word. Lee does not disclose,³ however, determining whether an input from a user is an allowable response to a preceding message stored in an output message buffer if the input from the user is not determined to be an allowable response to a most recent message. Lee thus fails to disclose each element required by independent claims 24, 28 and 29.

APPLEBY -- Application No. 09/051,070

Independent claims 24, 28 and 29 further require an interactive dialogue apparatus for simulating dialogue with a user. The final rejection states "...the examiner responds such feature as in the applicant's argument does not appear in the claims or in the functional language." (See page 9, lines 9-12 of the final rejection). Appellant respectfully disagrees. Claims 24 and 29 explicitly require "An interactive dialogue apparatus for simulating dialogue with a user" and independent claim 28 explicitly requires "A method of operating an interactive dialogue apparatus for simulating dialogue with a user." Rather than disclosing an interactive dialogue apparatus for simulating dialogue with a user, Lee discloses an automatic speech recognition system for recognizing key words in speech.

Claim 27, which depends from claim 24, requires "...provide[ing] language training, in which said rules, said words, and said output are in a training target language, and further being arranged to generate user guidance in a source language for said user and different to said target language." As discussed above with respect to dependent claim 6, Appellant respectfully submits that Lee fails to disclose this feature. Lee fails to provide any language training whatsoever, let alone providing output in a training target language and user guidance in a source language.

Claim 25, which depends from claim 24 and claim 30 which depends from claim 1 require:

"wherein said rule store stores first rules comprising criteria specifying correct relationships between words of said lexical store, and, associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input using both said first rules and second rules."

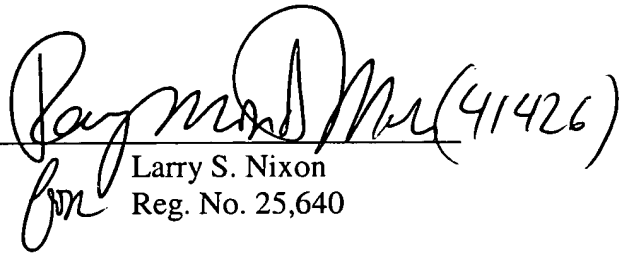
As discussed above with respect to claim 2, Lee fails to disclose this feature.

CONCLUSION

For all of the reasons set forth above, it is respectfully requested that this appeal be granted and that the rejections discussed above be reversed.

Respectfully submitted,

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APPENDIX OF CLAIMS ON APPEAL

1. Training apparatus for training a user to engage in transactions with another person whom the apparatus is arranged to simulate, the apparatus comprising:
 - an output device for outputting of messages to a user;
 - an input for receiving input from the user;
 - a lexical store containing data relating to individual words of said input;
 - a rule store containing rules specifying grammatically allowable relationships between words of said input;
 - a transaction store containing data relating to allowable transactions between said user and said person, said data defining, for said output messages, types of allowable inputs from said user;
 - an output message buffer for storing data representative of the most recent message output by the output device and at least a preceding one of said messages output from the output device;
 - a processor having at least read access to the lexical store and the rule store, said processor being arranged to process the input by comparing the input with the words contained in said lexical store and with the relationships specified by the rules contained in said rule store, in order to recognize the occurrence in the input of words contained in said lexical store and in the relationships specified by the rules contained in said rule store, and, in dependence upon said recognition, to generate output indicating when correct input has been recognized; and wherein said processor is further responsive to the data contained in the message buffer and the transaction store to:

APPLEBY -- Application No. 09/051,070

(a) determine whether said input is an allowable response to a most recent one of the output messages represented by data stored in the output message buffer; and

(b) if said input is not determined to be an allowable response to a most recent one of the messages, determine whether said input is an allowable response to a preceding message represented by data stored in the output message buffer;

an output device for making the output available to the user so that said user can be trained to engage in transactions with another person.

2. Training apparatus for training a user to engage in transactions with another person whom the apparatus is arranged to simulate, the apparatus comprising:

an input for receiving input dialogue from a user;

a lexical store containing data relating to individual words of said input dialogue;

a rule store containing rules specifying grammatically allowable relationships between words of said input dialogue;

a transaction store containing data relating to allowable transactions between said user and said person;

a processor having at least read access to the lexical store, the rule store and the transaction store, said processor being arranged to process the input dialogue by comparing the input dialogue with the words contained in said lexical store, with the relationships specified by the rules contained in said rule store, and with the data specified in the transaction store, in order to recognize the occurrence in the input dialogue of words contained in said lexical store, in the relationships specified by the rules contained in said rule store, in accordance with the data

APPLEBY -- Application No. 09/051,070

specified in the transaction store, and, in dependence upon said recognition, to generate output dialogue indicating when correct input dialogue has been recognized; and

an output device for making the output dialogue available to the user so that said user can be trained to engage in transactions with another person;

wherein said rule store contains first rules comprising criteria specifying correct relationships between words of said lexical store, and, associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input dialogue using both said first rules and second rules.

3. Apparatus according to claim 2, wherein said relationship criteria correspond to agreements between words.

4. Apparatus according to claim 1, in which the processor is arranged to generate output responsive to input, and to detect recognized errors in said input, and, on detection thereof, to indicate said recognized errors separately of said responsive output.

5. Apparatus according to claim 2, in which said processor is arranged to detect said recognized errors on detection of input dialogue containing words which meet said second, but not said first, rules.

APPLEBY -- Application No. 09/051,070

6. Apparatus according to claim 1 which is arranged to provide language training, in which said rules, said words, and said output are in a training target language, and further arranged to generate user guidance in a source language for said user and different to said target language.

7. Apparatus according to claim 6 in which the user guidance comprises guidance as to the meaning of the output.

8. Apparatus according to claim 6 in which the user guidance comprises an explanation of any detected errors in the input.

9. Apparatus according to claim 6 in which the user guidance indicates suitable further input which could be provided.

10. Apparatus according to claim 1 in which said input and/or said output comprise text.

11. Apparatus according to claim 1, in which said input comprises speech, and further comprising a speech recognizer arranged to recognize the words of said speech.

12. Apparatus according to claim 1 in which said output comprises speech, said apparatus further comprising a speech synthesizer.

13. Apparatus according to claim 1, further comprising a user interface arranged to accept said input and make available said output to the user.

14. Apparatus according to claim 13, in which said user interface comprises a display and in which said output is displayed on said display.

15. Apparatus according to claim 6, in which said user interface comprises a display to display said output and user guidance is normally not displayed on said display, and further comprising an input device via which a user may selectively cause the display of said user guidance on said display.

16. Apparatus according to claim 13, in which said user interface is located remotely from said processor and is coupled thereto via a communications channel.

20. Apparatus according to claim 3, wherein said agreements between words comprises agreements of gender or agreements of number.

21. Apparatus according to claim 1, further comprising an inflection store operatively coupled to said lexical store.

22. Apparatus according to claim 21, wherein each record in said

APPLEBY -- Application No. 09/051,070

lexical store contains a pointer to one of records in said inflection store.

23. Apparatus according to claim 21, wherein the number of records in the inflection store is smaller than the number of records in the lexical store.

24. An interactive dialogue apparatus for dialogue with a user, the apparatus comprising:

an output device for outputting messages to the user;

an input device for receiving input from the user;

a lexical store for storing data relating to individual words;

a rule store for storing rules specifying grammatically allowable relationships between words of said input;

a processor for processing said input to recognize occurrence in the input of words stored in said lexical store and in the relationships specified by the rules stored in said rule store;

an output message buffer for storing data representative of a plurality of messages output to said user; and

a transaction store for storing data defining, for each of said messages, a type of allowable response;

said processor being responsive to an input from said user, to the data stored in the output message buffer and to the data stored in the transaction store to:

(a) determine whether said input is an allowable response to a most recent one of the messages represented by data stored in the output message buffer; and

APPLEBY -- Application No. 09/051,070

(b) if said input is determined not to be an allowable response to a most recent one of the messages, determine whether said input is an allowable response to another one of the messages represented by data stored in the output message buffer.

25. Apparatus according to claim 24, wherein said rule store stores first rules comprising criteria specifying correct relationships between words of said lexical store, and, associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input using both said first rules and second rules.

26. Apparatus according to claim 24, wherein the processor is arranged to generate output responsive to input, and to detect recognized errors in said input, and, on detection thereof, to indicate said recognized errors separately of said responsive output.

27. Apparatus according to claim 24, said apparatus being arranged to provide language training, in which said rules, said words, and said output are in a training target language, and further being arranged to generate user guidance in a source language for said user and different to said target language.

28. A method of operating an interactive dialogue apparatus for simulating dialogue with a user, the method comprising:

outputting messages to the user;

APPLEBY -- Application No. 09/051,070

receiving input from the user;

storing data relating to individual words;

storing rules specifying grammatically allowable relationships between words of the input;

processing said input to recognize occurrence in the input of words related to stored data and relationships specified by the stored rules;

storing message data representative of a plurality of messages output to the user; and

storing data defining, for each of the output messages, a type of allowable response;

determining whether an input is an allowable response to a most recent one of the stored messages represented by stored message data; and

if the input is not determined to be an allowable response to a most recent one of the messages, determining whether the input is an allowable response to another stored message represented by stored message data.

29. An interactive dialogue apparatus for dialogue with a user, the apparatus comprising:

an output device for outputting messages to the user;

an input device for receiving input from the user;

a processor for processing said input;

an output message buffer for storing a plurality of messages output to the user; and

a transaction store for storing a type of allowable response for each of the messages output to the user;

APPLEBY -- Application No. 09/051,070

wherein the processor determines whether the input is an allowable response to a most recent one of the messages output to the user, and if not, determining whether the input is an allowable response to a previous one of the messages output to the user.

30. Training apparatus according to claim 1, wherein said rule store stores first rules comprising criteria specifying correct relationships between words of said lexical store, and, associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input using both said first rules and second rules.